

FORM PTO-1390
(REV 11-98)

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER

TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371

00118

U.S. APPLICATION NO. (if known, see 37 CFR 1.5)

09/581196

INTERNATIONAL APPLICATION NO.
PCT/DE98/00623INTERNATIONAL FILING DATE
4 March 1998PRIORITY DATE CLAIMED
20 December 1997

TITLE OF INVENTION ELECTRODE FOR DISCHARGE LAMPS



APPLICANT(S) FOR DO/EO/US

Thomas EGGERS

23338


Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

PATENT TRADEMARK OFFICE

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☐ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
 - a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ has been transmitted by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ have been transmitted by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☐ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern document(s) or information included:

11. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A FIRST preliminary amendment.
☐ A SECOND or SUBSEQUENT preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☒ Other items or information: Small entity declaration
Translation of Amended Sheets, pages 1-5

U.S. APPLICATION NO. (known, see 37 CFR 1.53) 09/581196		INTERNATIONAL APPLICATION NO. PCT/DE98/00623		ATTORNEY'S DOCKET NUMBER 00118	
17. <input checked="" type="checkbox"/> The following fees are submitted: BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(5)): Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO \$970.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO \$840.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$760.00 International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4) \$670.00 International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4) \$96.00 ENTER APPROPRIATE BASIC FEE AMOUNT =				CALCULATIONS PTO USE ONLY	
Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).				\$	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	4 - 20 =	0	X \$18.00	\$	
Independent claims	2 - 3 =	0	X \$78.00	\$	
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ \$260.00	\$	
TOTAL OF ABOVE CALCULATIONS =				\$ 840.00	
Reduction of 1/2 for filing by small entity, if applicable. A Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28).				\$ 420.00	
SUBTOTAL =				\$ 420.00	
Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				\$	
TOTAL NATIONAL FEE =				\$ 420.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property				\$	
TOTAL FEES ENCLOSED =				\$ 420.00	
				Amount to be:	\$
				refunded	\$
				charged	\$
a. <input checked="" type="checkbox"/> A check in the amount of \$ <u>420.00</u> to cover the above fees is enclosed.					
b. <input type="checkbox"/> Please charge my Deposit Account No. _____ in the amount of \$ _____ to cover the above fees. A duplicate copy of this sheet is enclosed.					
c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. <u>04-0753</u> . A duplicate copy of this sheet is enclosed.					
NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.					
SEND ALL CORRESPONDENCE TO Dennison, Scheiner, Schultz & Wakeman 612 Crystal Square 4 1745 Jefferson Davis Highway Arlington, Virginia 22202 (703)412-1155 Ext. 23 (703)412-1161 (Fax)					
				 SIGNATURE	
				Ira J. Schultz NAME	
				28666 REGISTRATION NUMBER	

09/581196

534 Rec'd PCT/PTC 19 JUN2000

Dkt. 00118

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

THOMAS EGGERS

PCT

Serial No.: none assigned
(PCT/DE98/00623)

Filed: Concurrently Herewith

For: ELECTRODE FOR DISCHARGE LAMPS

PRELIMINARY AMENDMENT

Honorable Commissioner of Patents and Trademarks
Washington, D.C. 20231

Sir:

Before calculation of the filing fee, please amend
the above-identified application as follows:

IN THE CLAIMS:

Please examine Claims 1-4 found on the "Amended
Sheet," page 5.

Page 5, line 1, change "Claims" to --WHAT IS CLAIMED
IS:--

Claim 3, line 1, change "one of claims 1 or 2" to
--claim 1--.

Claim 4, line 1, change "one of claims 1 or 2" to
--claim 1--.

REMARKS

The claims have been amended to delete the multiple
dependencies.

Respectfully submitted,



Ira J. Schultz
Registration No. 28666

13433
US

Docket No. _____

PATENT

☐ In re application of:
☐ Serial No.:
☐ Filed on:

☐ Patentee
☐ Patent No.:
☐ Issued on:

Title: ELECTRODE FOR DISCHARGE LAMPS

**STATEMENT CLAIMING SMALL ENTITY STATUS
 (37 CFR 1.9(f) and 1.27(b)—INDEPENDENT INVENTOR**

As a below named inventor, I hereby state that I qualify as an independent inventor, as defined in 37 CFR 1.9(c), for purposes of paying reduced fees to the United States Patent and Trademark Office under Sections 41(a) and (b) of Title 35, United States Code, to the Patent and Trademark Office, with regard to the invention described in

- ☐ the specification filed herewith, with title as listed above.
☐ the application identified above.
☐ the patent identified above.

I have not assigned, granted, conveyed or licensed, and am under no obligation under contract or law to assign, grant, convey or license, any rights in the invention to any person who would not qualify as an independent inventor under 37 CFR 1.9(c), if that person had made the invention, or to any concern that would not qualify as a small business concern under 37 CFR 1.9(d), or a nonprofit organization under 37 CFR 1.9(e).

Each person, concern or organization to which I have assigned, granted, conveyed, or licensed or am under an obligation under contract or law to assign, grant, convey, or license any rights in the invention is listed below:

- ☐ No such person, concern, or organization exists.
☐ Each such person, concern or organization is listed below.

***NOTE:** *Separate statements are required from each named person, concern or organization having rights to the invention as to their status as small entities (37 CFR 1.21)*

FULL NAME _____

ADDRESS _____

☐ INDIVIDUAL ☐ SMALL BUSINESS CONCERN ☐ NONPROFIT ORGANIZATION

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

EGGERS, Thomas

Name of Inventor



Signature of Inventor

Date

June
X 14.6.2000

Name of Inventor

Date

Signature of Inventor

09/581196

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ELECTRODE FOR DISCHARGE LAMPS

The invention relates to an electrode for discharge lamps having a pin at least partially surrounded by a solid body, wherein the electrode body is formed from a wire winding.

Electrodes of the type mentioned in the introduction are used in discharge lamps in order to release or receive electrons during a gas discharge. The electrodes each contain a pin, at the free end of which electrons either emerge from the pin or enter it at this end, wherein the pin is generally partially surrounded by a cooling body in the proximity of its free end, which cooling body is usually formed from a wire wound around the pin. The pin is produced from a high-melting conductive material, usually tungsten and can contain additives of thorium, lanthanum, cerium and yttrium.

It has been shown that both the application of such a cooling body formed from a wound wire on the pin and also a robust attachment of the cooling body to the pin can only be achieved at a high technical cost, wherein the results with respect to a firm attachment of the cooling body to the pin are not satisfactory

Electrodes for discharge lamps are known from EP 0 209 199 A1 and also from FR 2 087 545 A1, wherein the cooling body or electrode body is formed from a wire winding. These electrodes have the disadvantage, however, that the wire winding is not connected to the pin firmly enough and therefore a robust unit is not formed from the electrode body and the pin.

It is the object of the invention to create an electrode for discharge lamps, wherein the electrode body is firmly connected to the pin and forms a robust unit therewith.

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For an electrode of the type mentioned in the introduction, this object is achieved in that the electrode body is welded to the pin at one or more fixing points by means of laser beams.

Alternatively this object is achieved for an electrode of the type mentioned in the introduction in that the electrode body is welded to the pin at one or more fixing points by means of electron beams.

By means of the feature in which the invention resides, that the electrode body formed from a wire winding is welded to the pin at one or more fixing points by means of laser beams or electron beams, it is achieved in the electrode in accordance with the invention that in addition to the friction force which is achieved by an elastic pretensioning of the wire winding surrounding the pin, a further anchoring of the electrode body to the pin is achieved by directly welding the two components at at least one random position at which these components come into mutual contact. In this way the overall strength by which the electrode body is connected to the pin is increased. Furthermore, by means of the effect of the laser beam on the surface of the pin, a deformation thereof is caused, which results in a local change in radius or enlargement in radius. By reason of this deformation the solid body is prevented from slipping over the pin or from being pushed thereover.

In so doing it has been shown that by reason of the brittleness of the welded materials which occurs during a welding process, a connection of this type can only be achieved by laser beams or electron beams since only with these types of beams is it possible to apply a sufficiently large amount of energy to the materials concerned per unit of time in order to produce a very small, quasi spot weld site between these materials and at the same time to make the pin material brittle only locally.

Preferred embodiments of the invention are the subject of the subordinate claims.

In the case of the electrode in accordance with the invention at least one end of the wire winding, preferably the end of the wire winding lying freely on the outside, is severed by laser

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beams in order to separate it from the remaining winding wire after the winding process. In this way it becomes possible to produce wire windings for electrodes particularly quickly and cost-effectively. In accordance with preferred embodiments this end of the wire winding is melted back as far as the outer diameter of the wire winding so that it does not protrude from the wire winding or only does so to an insignificant degree. In this way a wire winding is created which is homogenous in its outer dimensions and has optimal properties with respect to effectiveness and long service life.

The electrode in accordance with the invention will be explained hereinafter with the aid of a preferred embodiment which is illustrated in the Figures of the drawing in which:

Fig. 1 illustrates a conventional discharge lamp in a transverse cross-sectional view;

Fig. 2 illustrates an electrode for discharge lamps according to the prior art, in a side view,

Fig. 3 illustrates a preferred embodiment of the electrode in accordance with the invention, in a side view.

In the case of the discharge lamp 10 illustrated in Fig. 1, two electrodes 11, 11' are disposed inside a silica glass bulb 12 in such a way that in each case one end, which is also designated as electrode pin 13, 13', is welded in the glass bulb 12. The electrodes 11, 11' are disposed opposite each other at opposite ends of the bulb 12. The electrode pins 13, 13' are connected by molybdenum foils 14, 14' to molybdenum pins 15, 15' which are each provided for connection to the power supply. The molybdenum foils 14, 14' thus act as power supply elements to the electrode pins 13, 13' inside the glass bulb. The electrodes 11, 11' each also comprise a free electrode end 16, 16' also referred to as a "tip", wherein between the electrode ends 16, 16' an electron exchange can take place in such a way that the respective electrode end emits electrons and the other electrode end forms an input for electrons. The electrodes 11, 11' are each surrounded in the region of their ends 16, 16' by an electrode body or cooling body 17, 17'.

In Fig. 2 a conventional electrode 11 as used in a discharge bulb 12 in accordance with Fig. 1

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is illustrated in a side view. The electrode body or cooling body 17 is formed from a wire wound around the electrode 11, the ends 17a and 17b of which are free. As shown in the Figure, the wire can be wound in two layers in respectively different directions.

In the electrode 11 in accordance with the invention illustrated in Fig. 3, like reference numerals designate like components as in the electrode illustrated in Fig. 2. In contrast to the electrode illustrated in Fig. 2, the electrode illustrated in Fig. 3 comprises four fixing points 19, 19', 19'' and 19''' at which the wire winding 17 is spot welded to the electrode pin 18. The number of fixing points 19, 19', 19'' and 19''' is only given as an example in the illustrated embodiment. It is also possible to envisage a larger or a smaller number of fixing points. In particular if a fixing point is formed with a large volume it is sufficient in terms of the solution of the object forming the basis of the invention if only a single fixing point 19 is provided.

In the case of the electrode in accordance with the invention illustrated in Fig. 3, the ends 17a and 17b of the wire winding 17 are severed from the wire - used for winding the winding 17 - during manufacture by means of laser beams. The ends 17a and 17b of the wire winding 17 are melted back to the respective outer diameter of the wire winding 17 so that, in contrast to the wire ends 17a and 17b of the electrode illustrated in Fig. 2, they do not protrude beyond the wire winding 17.

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Claims

- 1 Electrode (11, 11') for discharge lamps (10) having a pin (13, 13') at least partially surrounded by an electrode body (17, 17'), wherein the electrode body (17, 17') is formed from a wire winding, characterised in that the electrode body (17, 17') is welded to the pin (13, 13') at one or more fixing points (19, 19', 19'', 19''') by means of laser beams.
- 2 Electrode (11, 11') for discharge lamps (10) having a pin (13, 13') at least partially surrounded by an electrode body (17, 17'), wherein the electrode body (17, 17') is formed from a wire winding, characterised in that the electrode body (17, 17') is welded to the pin (13, 13') at one or more fixing points (19, 19', 19'', 19''') by means of electron beams.
- 3 Electrode (11, 11') according to one of claims 1 or 2, characterised in that at least one end of the wire winding (17, 17') is severed by means of laser beams
- 4 Electrode according to one of claims 1 or 2, characterised in that at least one end (17a, 17b) of the wire winding (17, 17') is melted back to the outer diameter of the wire winding (17, 17').

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Fig. 1

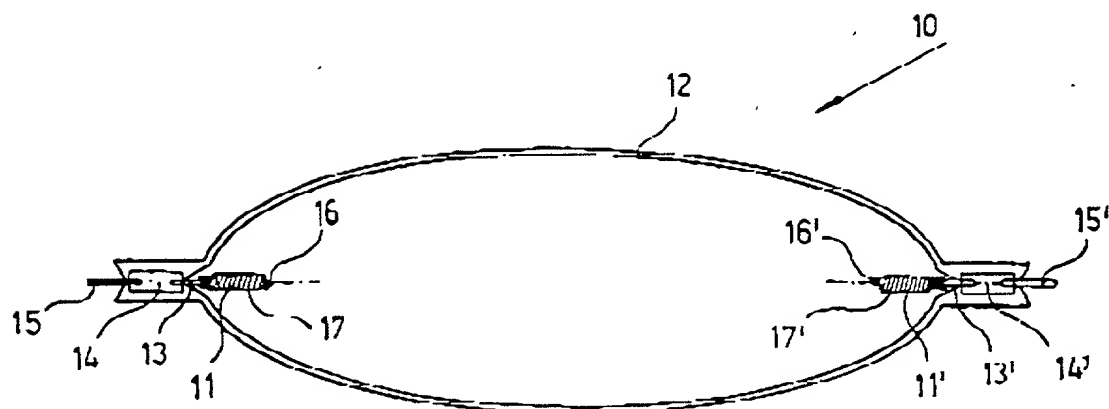


Fig. 2

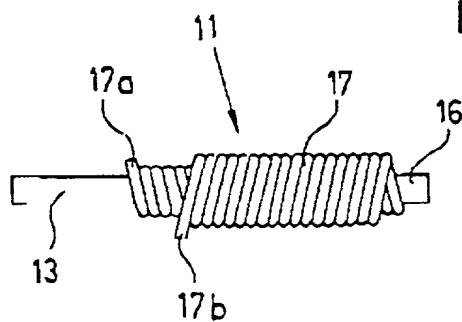
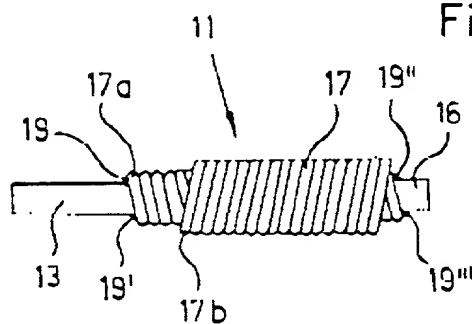


Fig. 3



ERSATZBLATT (REGEL 26)

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